

Seasonal Changes in Host Plant Preference of the Blue-green Sharpshooter *Hordnia circellata*

(Homoptera: Cicadellidae)

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In California's north coastal counties, the blue-green sharpshooter *Hordnia circellata* (Baker) is the most important vector of Pierce's disease of grapevines (Hewitt *et al.*, 1942, Severin 1949, Winkler *et al.*, 1949, Purcell 1975). Freitag (1951) listed 93 species in 23 families of natural and cultivated plants as hosts of the causal pathogen of Pierce's disease. Thus the relative importance of various plant species as food and oviposition hosts of *H. circellata* is of considerable interest relative to the epidemiology of Pierce's disease as well as to the ecology of its chief vector in coastal California.

The blue-green sharpshooter is found on many host plant species. Frazier (in Winkler, 1949) reported that more than 150 species of plants had been recorded as hosts. Severin (1949) noted that a wide variety of ornamental species in Berkeley, California were commonly infested.

In the course of trapping and collecting these leafhoppers in Napa County, California from 1972 to 1975, I noticed that the host plants on which *H. circellata* was most commonly found followed a seasonal sequence.

At least twice per month and usually once a week from April, 1972 to November, 1974 and much less frequently in 1975, I searched for and collected *H. circellata* at 4 sites along the Napa river between Yountville and St. Helena, California, and at 2 sites on the eastern slope of Spring Mtn. 3 to 5 mi. west of St. Helena. All of these locations were adjacent to commercial vineyards, described in a previous publication (Purcell 1975). Collecting was by a 15 in. sweep net or direct search of foliage.

RESULTS

Fig. 1 summarizes the most commonly inhabited host plants along vineyard study sites in the Napa Valley. The length of the apparent attractiveness of any particular host plant varied as much as three weeks from year to year, especially from late Aug. until November and from location to location depending on site factors such as shade and soil moisture, as will be discussed in a later section.

Nymphal Host Plants.—The most important hosts for oviposition and

subsequently for nymphal development were relatively few compared to the number of food hosts (Fig. 1). Blackberries, especially *Rubus procerus* P. J. Mueller and *R. vitifolius* Chamisso and Schlechtendal; elderberry, *Sambucus caerulea* Rafinesque and *S. mexicana* Presl; wild grape, *Vitis californica* Benthams; Mugwort, *Artemisia Douglasiana* (*vulgaris* of Jepson) Besser (in Hooker); and nettle, *Urtica* spp., were the most common breeding hosts as shown in Fig. 1. I occasionally collected nymphs on cocklebur, *Xanthium strumarium* (L.); California figwort, *Scrophularia californica* Chamisso and Schlechtendal; and Ash, *Fraxinus* sp. In the mountains of the northern Coast Range, a few nymphs were found regularly on *Rubus parviflorus* Nuttall, usually in moist, shaded sites.

Condition of Plant Growth.—In addition to plant species, the condition of plant growth and site factors such as shade and soil moisture seemed to influence host plant selection. Frazier (in Winkler, 1949) noted the feeding preference of this and other Cicadellinae (Tettigellinae) for the succulent tips of growing stems. This habit is quite pronounced in cultivated grapes (Purcell 1975) and extends to most other hosts. The only nymphs I have found on oak, *Quercus* spp. and walnut, *Juglans californica* Watson, were on vigorously growing shoots or suckers induced by severe pruning of the trunk or large branches. *H. circellata* can imbibe quantities of xylem sap daily that are hundreds of times its own body weight (Mittler 1967). Soil water tension and host plant physiological condition may affect the rate of flow of xylem sap and thus mediate host plant attractiveness for xylem feeding insects.

During the hot, dry California summer, *H. circellata* may be commonly found on blackberries, artemisia, and cocklebur only in shaded sites where soil moisture is sufficient to sustain continued rapid plant growth and is rarely found in open sites such as along railroad beds, roads or fencerows where these plants may be abundant but produce very little new growth as soil moisture is depleted. Cocklebur, for example, growing in full sun in unirrigated vineyards in Napa Valley seldom exceeds 1 m in height, whereas cocklebur growing in the shaded understory along the edge of a river often exceeds 2 m in height. Only the latter plants are commonly inhabited by adult and occasionally nymphal *H. circellata*. Cultivated grapes, *Vitis vinifera* L. are normally grown in full sun without irrigation in the Napa Valley and can support large numbers of the blue-green sharpshooter. Grapes, however, are heavily pruned and respond with luxuriant new growth as long as sufficient moisture is available. On shallow soils—typically in stony hillside vineyards—or

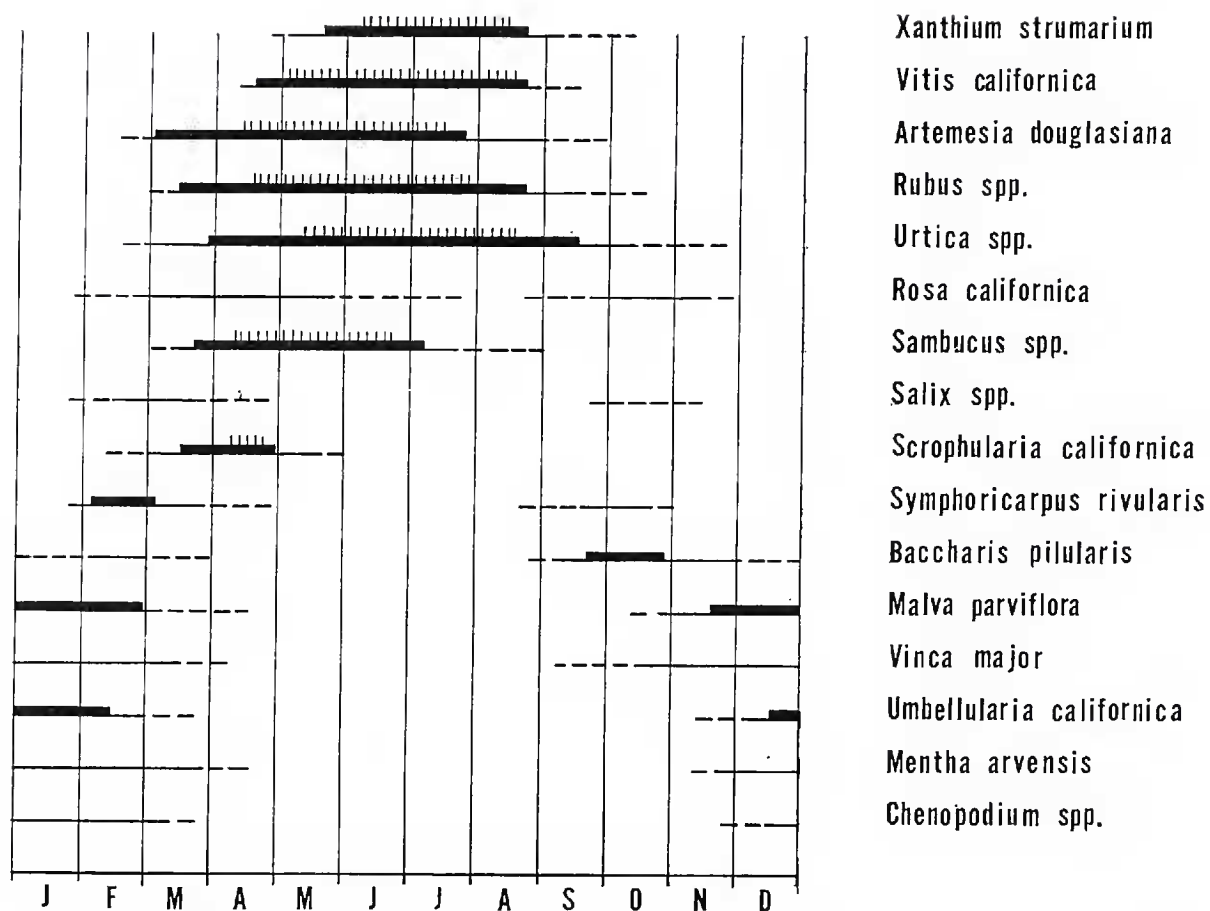


FIG. 1. Seasonal occurrence of *Hordnia circellata* on plant hosts, Napa Valley. Heavy solid line indicates period when *H. circellata* is commonly found; solid line indicates period of frequent but much less common occurrence; dashed line indicates only occasional occurrence. Vertical spikes indicate nymphs common. Plants identified according to Munz and Keck (1970).

in abandoned vineyards where grapevines produce much less succulent growth, *Hordnia* is only rarely found.

Fall Transition Period.—From late August to mid-September, as cultivated grapevines are senescing, *H. circellata* move to natural vegetation from vineyards as shown by sticky trap catches of flying adults (Purcell 1975). Normally at this time of year adults can be found on a variety of plant species which are either senescent or not adding new growth. Coyote bush, *Baccharis pilularis* De Candolle, and walnut, *Juglans* spp., are frequently fed upon during the early autumn or late summer despite their lack of recent growth. Freitag and Frazier (1954) observed adults leaving vineyards to feed on nearby Persian walnut *Juglans regia* L. I found these sharpshooters feeding on the fruits of leafless horse chestnuts, *Aesculus californica* Nuttall, in November 1975 along the Napa River. Relatively large catches on yellow sticky traps at this time of year (Purcell 1975) contribute to the supposition formed by direct observation that adults may change hosts

in rapid succession during the fall transition to cooler, wetter weather. Cool temperatures seem to limit flight activity below 16°C (my unpublished data).

Winter Hosts.—From early to mid-November until late March, sharpshooters are difficult to locate. A few can be found on *Urtica* spp. growing in damp localities, *Malva parviflora* L., laurel, *Umbellularia californica* Nuttall, chicory, *Cichorium intybus* L., *Chenopodia* spp. including *C. murale* L. and *C. album* L., and rarely on other herbaceous hosts. Ornamental species escaped from cultivation such as *Vinca major* L. and ivy, *Parthenocissus tricuspidata* Planchon, are also fed upon during winter. Feeding adults are found most frequently during this period beneath trees (leafless or not) or along stands of brush along drainage ditches or streams. They are conspicuously absent from the usually dense growth of herbs and grasses in open vineyards, pastures, or meadows.

The gradual disappearance of adults in the fall and their rather sudden reappearance in the early spring in the same location suggests that adults do not normally disperse more than a few hundred meters from fall until spring. I have not recovered adults from leaf litter, beneath logs, bark, or other such suspect sheltered sites despite a great number of attempts. Adults may be found at all times during the winter in Berkeley, which has a mild winter climate, although they are difficult to locate on very cold days.

Effects of Host Plants on Sharpshooter Distribution.—The geographic distribution of *H. circellata* extends from Mexico and Arizona (DeLong and Severin 1949, Nielson 1968) to northern Oregon and probably at least as far north along the coast as Puget Sound or beyond. In essence *Hordnia* is an oasis dweller, whether its habitats are ornamental and shade trees in the desert town of Indio, California where it is an abundant nuisance pest, on stream-bank vegetation in the Chiricahua Mountains (Nielson 1968), a small bog at the bottom of a mountain ravine on the western slope of the Napa Valley, or the well-tended home gardens and parks of the San Francisco Bay area. DeLong (1965) has described the influence of site factors such as soil moisture and shade upon leafhopper food and habitat selection. These same factors seem to influence the host plant preference of *H. circellata* profoundly.

ACKNOWLEDGMENTS

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SCIENTIFIC NOTE

A New Record of Purpuricene Cerambycid from America North of Mexico.—Two specimens of a very distinct cerambycid were collected by the author and P. H. Sullivan, at Kitt Peak in the Baboquivari Mountains, Pima County, Arizona, in September 1969. Through reference with the *Biologia Centrali Americana*, these specimens have been tentatively identified as *Mannophorus forreri*, Bates. Records of this species have been limited to Durango, Mexico, and the discovery of these specimens can be considered an important addition to the knowledge of the cerambycid fauna of the United States. Since the initial record in 1969, numerous specimens have been taken on various species of Compositae at the Kitt Peak site. Specimens are in the collections of D. G. Marqua, A. E. Lewis, F. T. Hovore, E. M. Geisbert, California Academy of Science Sciences, San Francisco, and the University of California, Berkeley.—DAVID G. MARQUA, *Los Angeles County Nature Centers, 1000 N. Durfee Avenue, S. El Monte, California 91733.*